IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Zuniga et al.	Art Unit	: 1763
Serial No.	: 10/826,185	Examiner	: Sylvia R. MacArthur
Filed	: April 15, 2004	Conf. No.	: 9780
Title	: METHODS FOR A MULTILAYER RETAINING RING		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF INVENTORS UNDER 37 C.F.R. § 1.131

Steven M. Zuniga and Thomas H. Osterheld, hereby declare:

1. Steven M. Zuniga and Thomas H. Osterheld are inventors of the claims in the above-captioned patent application.

2. Lawrence M. Rosenberg is deceased. The invention of Lawrence M. Rosenberg is no longer being claimed as a result of the accompanying amendment of the claims.

3. Steven M. Zuniga has been an employee of Applied Materials, Inc. since August 1994.

4. Thomas H. Osterheld has been an employee of Applied Materials, Inc. since September 1995.

5. In a non-final Office Action dated May 2, 2006, the claims were rejected as being unpatentable over U.S. Patent No. 6,068,548 ("Vote"). Vote was filed on December 17, 1997, and on its face does not claim priority to an earlier filed application or patent.

CERTIFICATE OF MAILING BY FIRST CLASS MAIL

I hereby certify under 37 CFR §1.8(a) that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage on the date indicated below and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date of Deposit

Signature

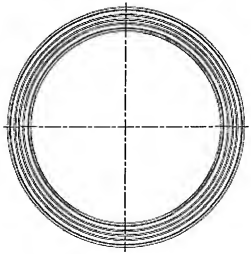
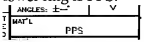
Typed or Printed Name of Person Signing Certificate

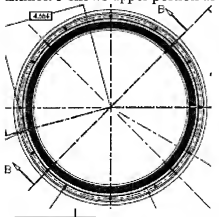
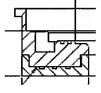
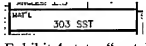
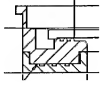
6. On or before December 17, 1997, in the United States, Steven M. Zuniga and Thomas H. Osterheld conceived of a method of assembling a retaining ring. The method includes securing a generally annular lower portion made of a plastic and having a bottom surface for contacting a polishing pad during polishing to a bottom surface of a generally annular upper portion made of a metal which is more rigid than the plastic and having a top surface configured to be mechanically affixed to and abut a rigid base of a carrier head.

7. On or before December 17, 1997, in the United States, Steven M. Zuniga and Thomas H. Osterheld conceived of a method of polishing. The method includes holding a substrate on a substrate mounting surface that is vertically movable relative to a base rigid base of a carrier head in a chemical mechanical polishing apparatus, bringing the substrate into contact with a polishing surface, creating relative motion between the polishing surface and the substrate, and maintaining the substrate beneath the substrate mounting surface with a retaining ring. The retaining ring includes a generally annular lower portion having a bottom surface for contacting the polishing surface during polishing, and a generally annular upper portion having a bottom surface joined to the lower portion and a top surface fixed to and abutting the base, and the lower portion is made of a plastic and the upper lower portion is made of a metal which is more rigid than the plastic.

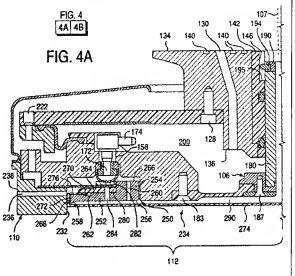
8. As evidence of conception and reduction to practice, Exhibits 1-3 are copies of CAD drawings prepared on or before December 17, 1997 by Steven Zuniga. Exhibit 1 includes a cross-sectional side view showing the upper and lower rings; Exhibit 2 includes a plan view and cross-sectional side view showing the lower ring; and Exhibit 3 includes a plan view and cross-sectional side views showing the upper ring. Exhibit 4 is a copy of a page from a presentation on or before December 17, 1997 in which Steven Zuniga prepared the bullet points. Exhibit 5 is a copy of a page from a presentation on or before December 17, 1997 by Tom Osterheld, the lead process engineer on the "composite ring" project, showing data from testing of the claimed retaining ring.

9. The following table shows the support in the Exhibits for the claimed invention as recited in independent claim 17.

Claim 17 Limitations	Support for Conception
A method of assembling a retaining ring	Exhibits 1-3 illustrate the retaining ring, "BONDED RING" refers to the retaining ring. Exhibit 4, discusses "retaining ring"; "Titan Head" refers to Applied Materials carrier head.
securing	Exhibit 1, illustrates the bottom surface of the upper ring contacting the lower portion and states "BOND WITH LOCTITE DEPEND 330 ADHESIVE". 
a generally annular lower portion	The plan view in Exhibit 2 shows the lower portion as annular. 
made of a plastic and having a bottom surface for contacting a polishing pad during polishing	Exhibit 2 provides that the material of the lower ring is PPS.  "PPS" refers to polyphenylene sulfide, which

	is a plastic. Exhibit 4, describes a "wear surface", indicating that the bottom surface contacts the polishing pad during polishing
to a bottom surface of a generally annular upper portion	Exhibit 3 shows upper portion as annular.   Exhibit 1, illustrates the bottom surface of the upper ring contacting the lower portion
made of a metal which is more rigid than the plastic	Exhibit 3 provides that the material of the upper ring is 303 SST. "SST" refers to stainless steel.  Exhibit 4 states "metal backing" Stainless steel is more rigid than polyphenylene sulfide.
and having a top surface configured to be mechanically affixed to and abut a rigid base of a carrier head.	Exhibits 1 and 3 show the top surface of retaining ring.  The complex shape of the top surface was configured to abut a base in the carrier head, e.g., in a manner similar to how the top surface of the completely plastic ring abutted the base in the carrier as shown in Figures 4A-4B of

U.S. Patent No. 6,183,354.



10. With respect to claim 1, Exhibit 5 shows data, specifically a polishing profile, from test polishing of a wafer using the claimed retaining ring. This testing included holding a substrate on a substrate mounting surface that is vertically movable relative to a base rigid base of a carrier head in a chemical mechanical polishing apparatus, bringing the substrate into contact with a polishing surface, creating relative motion between the polishing surface and the substrate, and maintaining the substrate beneath the substrate mounting surface with the retaining ring.

11. On or before December 17, 1997 a method of assembling a retaining ring having a metal upper portion and a plastic lower portion and a method of a method of polishing with a retaining ring having a metal upper portion and a plastic lower portion were reduced to practice by being performed and tested.

12. As evidence of reduction to practice, Exhibit 4 states "8 prototypes fabricated". These prototypes included rings meeting the limitations of claim 1. Exhibit 4 further states "Rigid bonded giving good performance". This refers to testing of the two-part retaining rings.

13. As further evidence of reduction to practice, Exhibit 5 shows data, specifically a polishing profile, from test polishing of a wafer using the claimed retaining ring.

14. The dates in Exhibits 1-5 have been redacted, however all the redacted dates were on or before December 17, 1997.

15. We hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

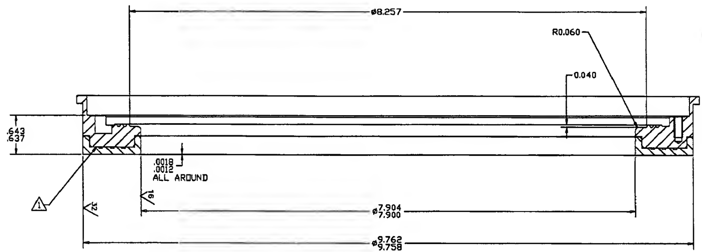
Full Name of Inventor: Steven M. Zuniga
Inventor's Signature: _____
Date: 11/2/2006

Full Name of Inventor: Thomas H. Osterheld
Inventor's Signature: _____
Date: 11/2/06

Exhibit 1

NOTES: UNLESS OTHERWISE SPECIFIED.

1. BOND WITH LOCTITE DEPEND 330 ADHESIVE PER MANUFACTURER'S INSTRUCTIONS



REV	DESCRIPTION	BY	DATE	APR

ITEM #	QTY	DESCRIPTION
NEXT ASSY	APPROVALS	DATE
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	CHECK	.
	ENGR	.
	MFG ENG	.
	APPD	

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TOL'S: .XX: ±.01 .XXX: ±.005 ANGLES: ±.1°

SURFACES 63

MAT'L SEE BOM

FINISH NONE

APPLIED MATERIALS®
3050 BOWERS AVE., SANTA CLARA, CA 95054

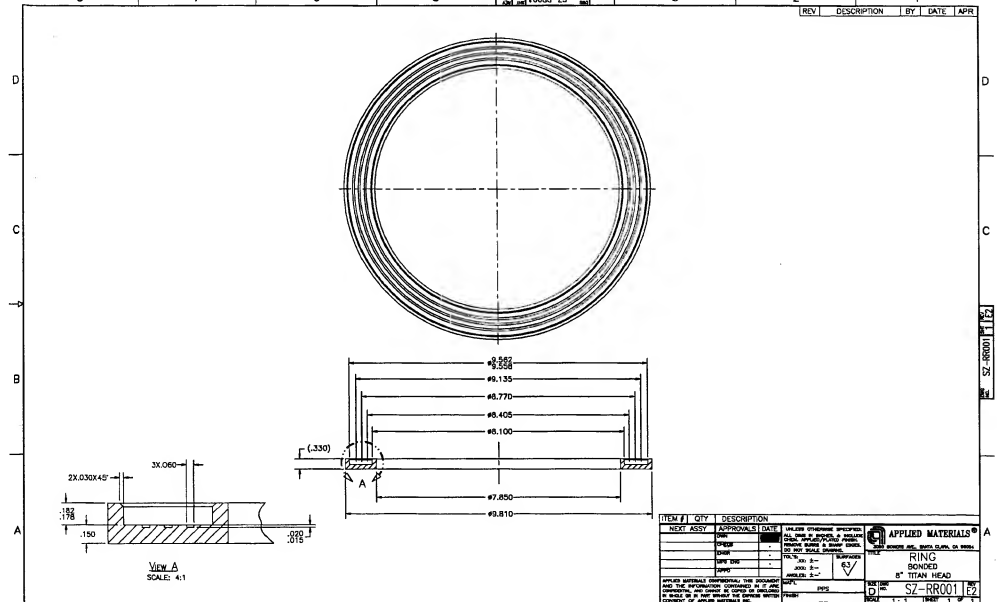
TITLE ASSEMBLY
BONDED RING
8" TITAN HEAD

SIZE D DWG NO. SZ-RR005 REV E2

SCALE 2 : 1 SHEET 1 OF 1

SZ_RR005E2

Exhibit 2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ø9.810
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3X.060
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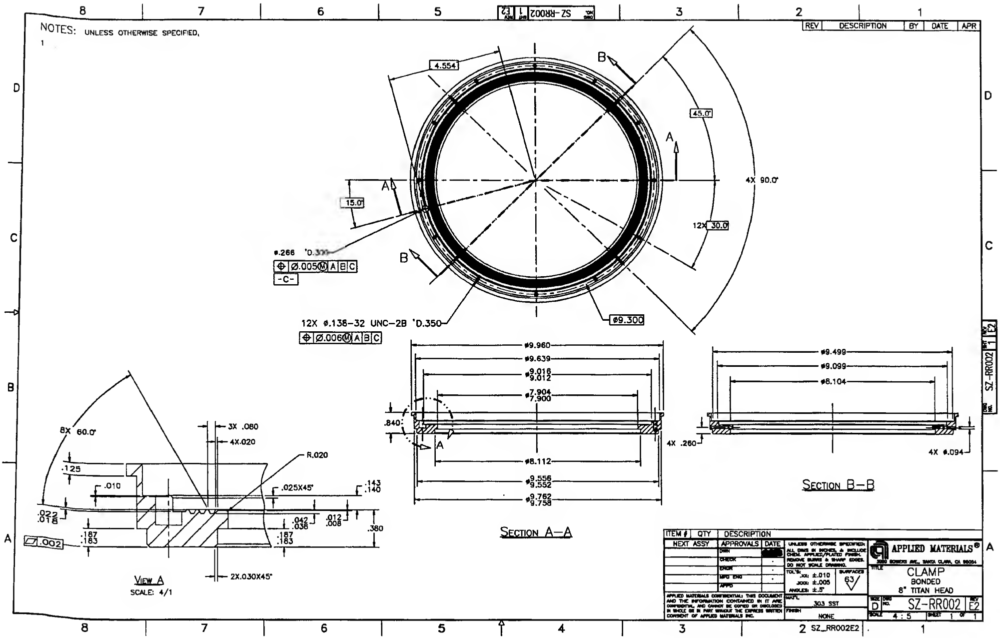
.178
.150
.020
.015
VIEW A
SCALE: 4:1
ITEM # | QTY | DESCRIPTION
NEXT ASSY | APPROVALS | DATE
DRWN
CHECK
ENGR
MFG ENG
APPD
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
TITLE
SURFACES
APPLIED MATERIALS
3050 BOWERS AVE., SANTA CLARA, CA 95054
RING
BONDED
8" TITAN HEAD
SIZE
D
DWG. NO.
SZ-RR001
REV
E2
SCALE 1:1
SHEET 1 OF 1
SZ_RR001E2

Exhibit 3


NOTES: UNLESS OTHERWISE SPECIFIED,
1
REV DESCRIPTION BY DATE APR
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45.0°
4X 90.0°
12X 30.0°
15.0°
A
B
ø.266 'D.300
⌖ Ø.005Ⓜ A B C
-C-
12X ø.138-32 UNC-2B 'D.350
⌖ Ø.006Ⓜ A B C
ø9.300
ø9.960
ø9.639
ø9.016 9.012
ø7.904 7.900
.840
ø8.112
ø9.556 9.552
ø9.762 9.758
SECTION A-A
ø9.499
ø9.099
ø8.104
4X .260
4X ø.094
SECTION B-B
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3X .080
4X.020
R.020
.125
.010
.025X45°
.143 .140
.022 .018
.042 .038
.012 .008
.380
.187 .183
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.002
2X.030X45°
VIEW A
SCALE: 4/1
ITEM # QTY DESCRIPTION
NEXT ASSY APPROVALS DATE
DWN
CHECK
ENGR
MFG ENG
APPD
UNLESS OTHERWISE SPECIFIED: ALL DIMS IN INCHES, & INCLUDE CHEM. APPLIED/PLATED FINISH. REMOVE BURRS & SHARP EDGES. DO NOT SCALE DRAWING.
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APPLIED MATERIALS®
3050 BOWERS AVE., SANTA CLARA, CA 95054
TITLE CLAMP BONDED 8" TITAN HEAD
SIZE D DWG NO. SZ-RR002 REV E2
SCALE 4 : 5 SHEET 1 OF 1
SZ_RR002E2

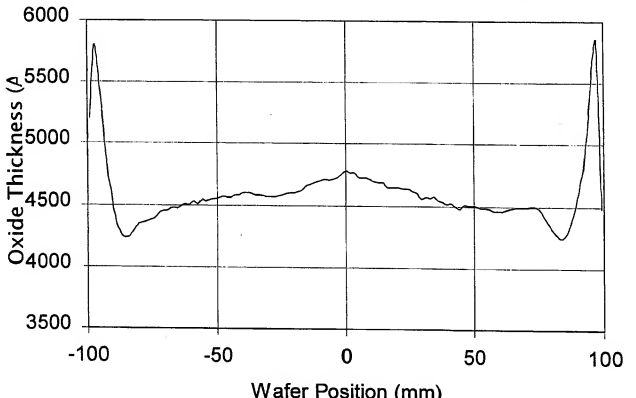
MIRRA™

Titan Head Roadmap

- "No Lap" retaining ring #1 priority for CMP group until manufacturable solution is identified. **Goal: Good solution by 10/31. Better solutions may follow.**
  - "No lap" ring development driving understanding of retaining ring: edge exclusion relationship - may result in long term EE improvements
  - ~8 prototypes fabricated
  - Focusing on metal backing with PPS wear surface
  - Rings with "compliance" give poor edge performance
  - Rigid bonded giving good performance - some ring to ring variability still seen in prototypes. Source of variation under investigation
  - "Crowned" PPS ring giving good performance

Exhibit 5

Stainless Steel/PPS Composite Ring Yields an Edge-Slow Process Under BKM Conditions



Issue: WIWNU Cannot be fixed by Retaining Ring Pressure